TECHNICAL FILE

FUN 14

I) Specifications of the main components

FUN 14 WING MODEL

a) Characteristics

Area	13.5 sqm
Airfoil type	Double surface 40%
Span	10 m
Aspect ratio	7.4
Length	3.4 m
Weight	38 kg

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b) Materials - Measurements

PARTS	MEASUREMENTS	MATERIALS	TREATMENT
Keel	Ø 47x1.3 Sleeve Ø 50x1.3	2017 A 6100.61 T6	Anodisation
Leading edges	Front Ø 50x1.3 Rear Ø 47x1.3 Ø 58x2	6100.61 T6 2017 A 6100.61 T6	" "
Crossbars	Ø 28x1.5	6082 T6	"
King post	Ø 28x3	6100.61 T6	"
'A' frame struts	Ø 28x3	6100 61 T6	"
Control bar	Ø 20x2	2017 A	"
Tip struts	Ø 10x0.8	7075 T6	"
Battens	Ø 20x1	2017 A	"
Nose batten	Ø 3.2	7x7 Stainless thread 302	PVC sheath
Lateral upper cable	Ø 2.5	"	"
Front longitudinal upper cables	Ø 2.5	"	"
Rear longitudinal upper cables	Ø 2.5	"	"
Lateral lower cables	Ø 3.2	"	"
Longitudinal lower cables	Ø 1.8	"	"
Tensioning cables	4 mm thick	6181	Anodization
Back-up ropes	3 mm thick	AU 4G	"
Hooking section	5 mm thick	AU 4G	"
Nose plate	4 mm thick	AU 4G	"
Crossbars link plates		6100 61	"
Link plates crossbars/L.E.		6100 61	"
Nose stirrup		6100 61	"
Crossbar stirrup		AU 4G	"
Tensioning lever		7020 T6	"
'A' frame base		AU 4G	"
'A' frame high stirrups		Nylon 6 SA	
King post foot		Nylon 6 SA	
King post head		Nylon 6 SA	
Crossbars bases	2 mm thick	Stainless 316 L	
Holes clutches		Stainless	
Shackles	180 gr/sqm	Trilam	
Upper surface fabric			
Leading edges bottom surface fabric	220 gr/sqm	Polyester	
Screw	Ø 6, Ø 8	Steel 80 kg/sqmm	Bichromatal/ zinc-coated
Ball spindle	Ø 6	Stainless 316 L	

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c) Hang point trike

Composed of a nylon part and of aluminum profile on which is fixed the trike hang point (lateral axle). The part receives as well the fastening of 'A' frame hightstirrups through the medium of a Ø 10mm screw. It is pivoting around the keel in order to insure roll clearance trike. Pitching is obtained directly by revolution of the trike around the hang point.

d) Folding

The folding system is an "umbrella" type. The two half-crossbars which maintain the leading edges opened are secured by several cables fixed at the rear of the keel. The breaking away of the cables (1 ball spindle) allow the structure re-bending, the two leading edges and the two half-crossbars placed one against the other. The king post is assembled on a feather. The 'A' frame is dismantled with a ball spindle as well as the front longitudinal cables.

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II) Flight and ground tests

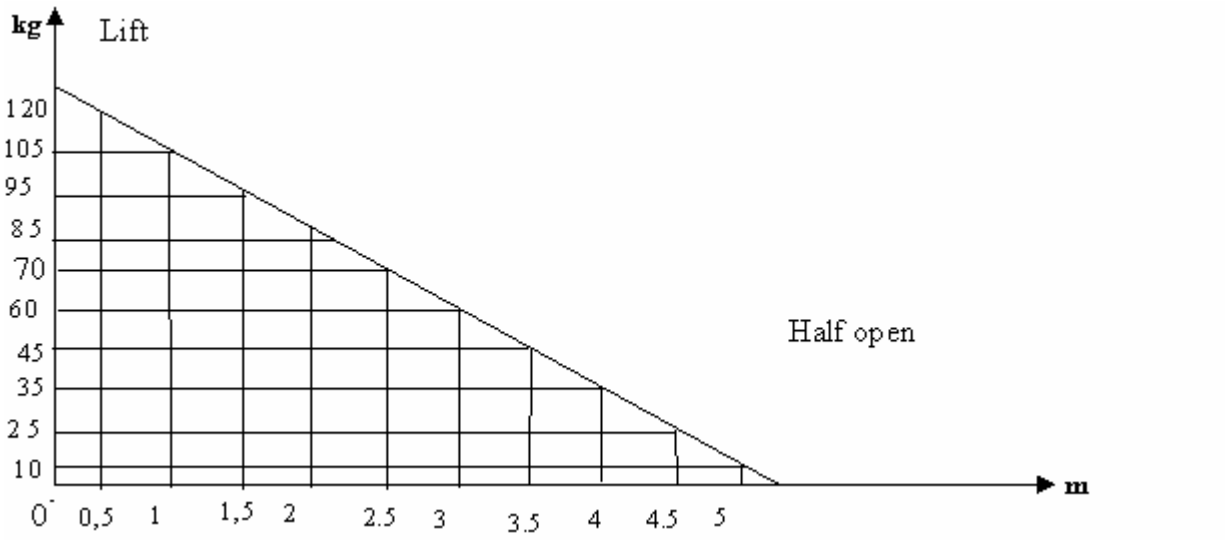
The FUN 14 has been subjected to the following tests programs:

– **Positive static load tests, proceeding**
Wing turned upside down is hung to a crane by the hang point trike. A 1,350 kg load of sand bags is set over the wing according to the repartition specified in the hereunder diagram. It is next lift up through the medium of the pulley block, with an angle of elevation about 18° to the center rope. The wing is hung like this during 5 minutes. The structure strain are scrutinized. The wing is laid and fully dismantled in order to determine the effect of strain over each part of the appliance and to check if there is any failure in the integral components. It has been proved than the breaking load is higher to 1,350 kg. Net weight of supporting sail is 25 kg (sail = 10 kg, battens = 3 kg, leading edges = 5 kg, cross bar = 7 kg). At the maximum mass allowed of 250 kg, we achieve :
1,350 kg = n x (250-25) = n x 225 kg
The ultimate load factor is n = 6g
The limit load factor n2 is 4 g.

– **Negative load tests :**
Wing hung right side under the crane by hang point trike. The last test is repeated, with a 675 kg load set over the upper surface sail.
No failure was noticed.
The negative ultimate load factor is n' = 3 g
The negative limit load factor n2 is 2 g.

SPAN REPARTITION

REPARTITION IN THE ROPE WAY



Resultant of loads is set over 25 % of the rope.

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FLIGHT TESTS :

The FUN 14 wing has executed during our tests more than 100 flying hours with our trikes RACER 447, RACER 503 and RACER 503 SL and S.

The following performances have been proved:

	RACER 447	**RACER 503**	**RACER 503 S-SL**
Maximum take-off weight	250 kg	250 kg	250 kg
Take-off roll • at Max Weight	40 m	35 m	40 m
Take-off distance to 15 m • M.W.	100 m	85 m	90 m
Landing roll • M.W.	40 m	40 m	40 m
Landing dist. from 15 m height • M.W.	140 m	140 m	140 m
Minimum flying speed with engine • M.W.	40 km/h	40 km/h	40 km/h
Mini. flying speed with engine cut • M.W.	40 km/h	40 km/h	40 km/h
Maximum level speed • M.W.	90 km/h	90 km/h	90 km/h
Best climbing angle speed • M.W.	43 km/h	43 km/h	43 km/h
Climb speed • M.W.	48 km/h	48 km/h	48 km/h
Rate of climb alt 0 • M.W.	5.5 m/s	7 m/s	7 m/s
Rate of climb alt 500 m • M.W.	5.3 m/s	6.8 m/s	6.8 m/s
Rate of climb 1000 m • M.W.	5 m/s	6.5 m/s	6.5 m/s
Minimum rate of descent • M.W.	1.6 m/s	1.6 m/s	1.6 m/s

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V.d speed of 130 km/h (1,1 VNE and 10 km/h) was maintained at full load during about 2 seconds in the course of dive resulting from an energetic stalling. It was impossible to maintain it any longer merely by the generated pull out of the wing pitching stability. Turn trials was carried with all the available speeds as well as most drastic loads. Stalling was get with various useful loads and centering positions. An unequivocal strengthening of thrust stress as well as wing flapping in central part prevent its apparition. Speed pick up and pull out entail a loss of altitude of 30 m at the maximal mass. The trials was set with energetic stalling (trimming + 60°) at most drastic loads and centering positions. The resulting break down is proportional to the trimming angle. The following loss of altitude reaches 40 m at the maximal mass. Pull out is quick even if the pilots has done any action to the control bar.

Turn stalling leads a quick revolution over the lace rivet followed a speed pick up and an acting pull out. A spin couldn't be obtained. Pitching neutral draw back was checked in stress and shifting for all the available centering positions by shifting of the hooking point and for drastic loads. Take-off and landing has been made with over 30 km/h side winds in good safety conditions. Tests have been achieved with our trikes RACER 447, 503, 503 SL and S at most drastic loads and various engine rates.

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